How To Create A Survex File

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(updated March 2022 by Philip Sargent)

Note: This tutorial will require survex and notepad++ to already be installed on your computer, and a basic understanding of Survey data. i.e. compass, Clino, distance and LRUD readings.
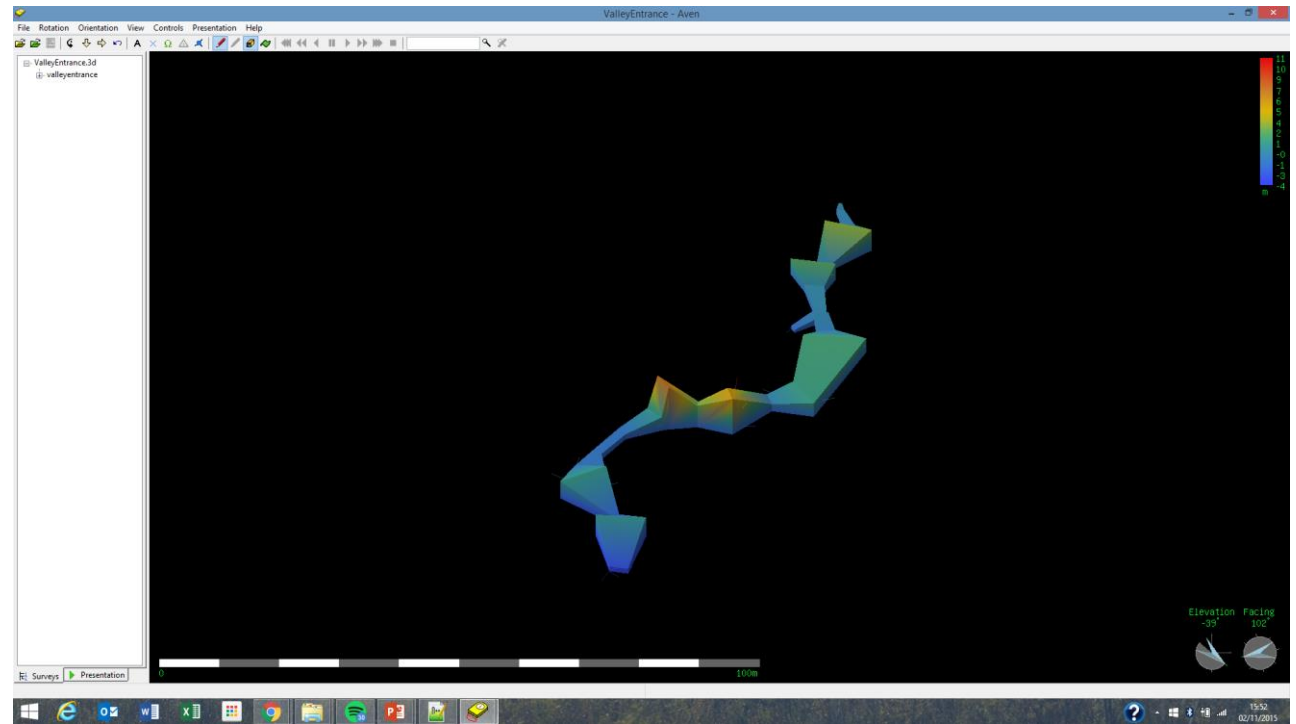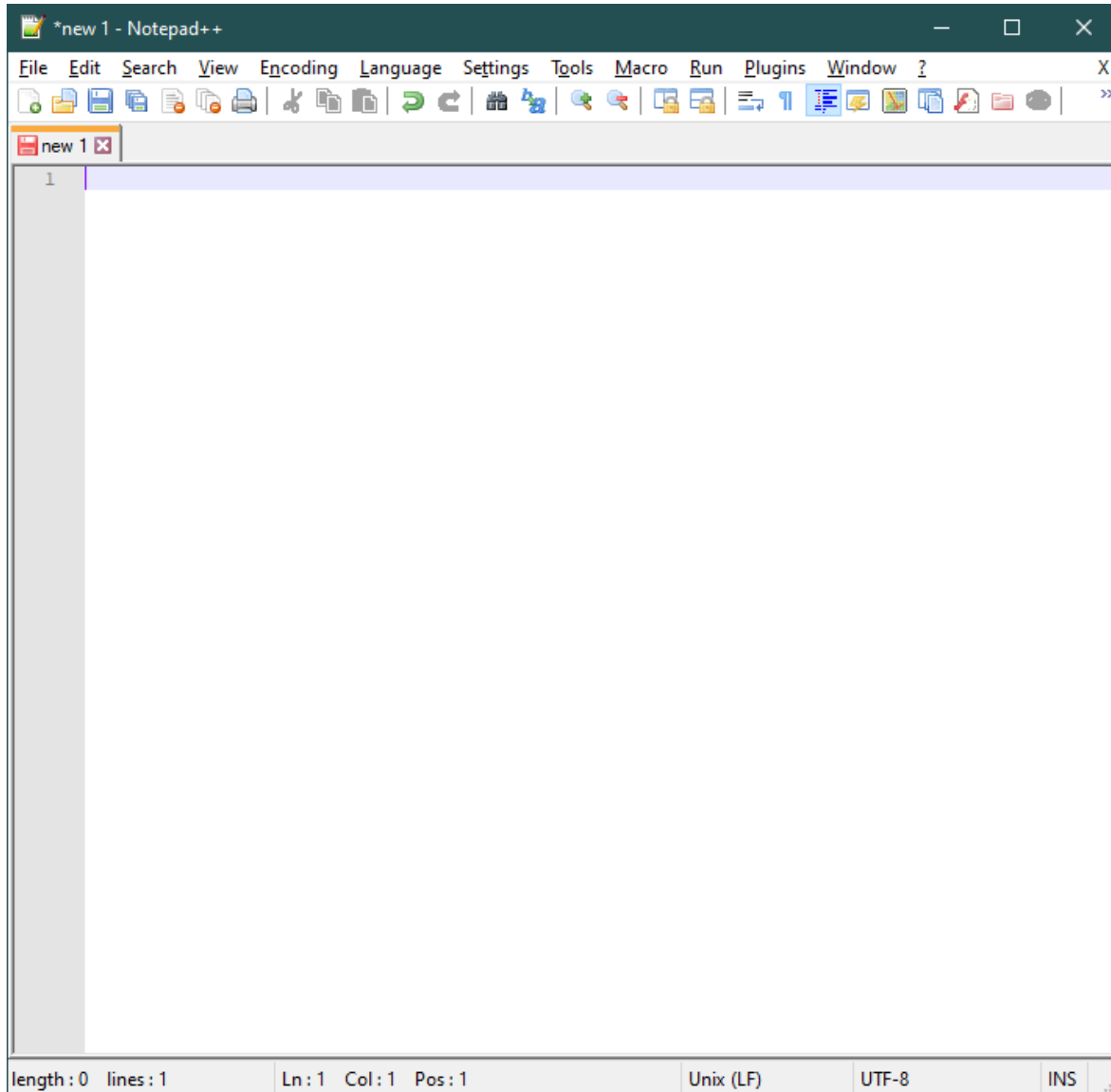
How to turn this…

Into this…

Step one: Open Notepad++

- Begin By opening a text editor, e.g. Notepad++.
- You you can use any text editor as long as it is capable of writing a plain "ASCII text file" (actually UTF-8 these days) and can save in Unix style end-of-line format

- In Notepad++, this is menu command:
  Edit ->EOL Conversion ->Unix (LF)
  The line-ending convention is shown in the bottom information bar in Notepad++
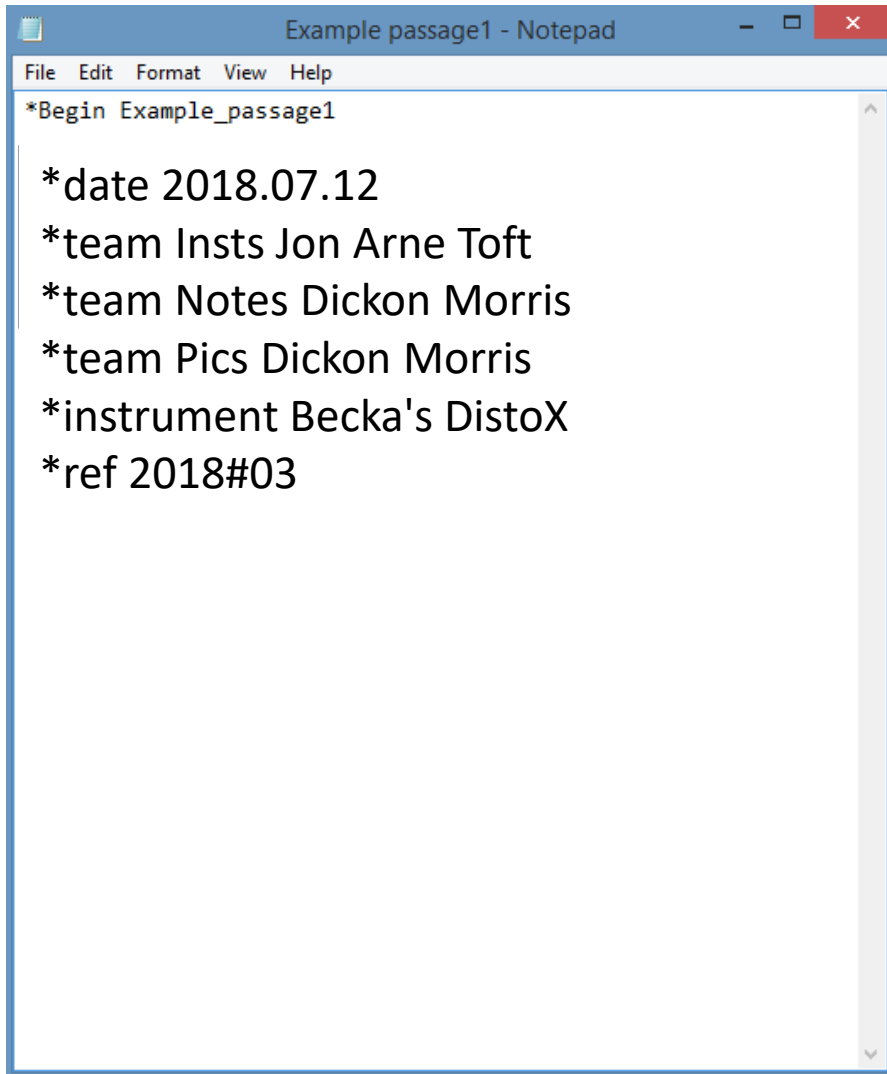
Step 2: Begin...

*Begin Example_passage1

- Insert Command "*begin (Insert name of cave passage)". The name of the cave passage should be unique and the same as the survex file name & it will later be used to tie two separate Survex files together.

- In Survex the * symbol indicates the beginning of a command.

- In a similar way, the semicolon symbol **;** is used to indicate the start of a comment, i.e. information which people may find useful when looking at the survey data later but isn't necessary in terms of creating a 3D file.
  - information such as station descriptions.
  - Team information (who was on book, who read compass ect.)

- **Important: the name of the file cannot contain a space, this leads to an error code when you come to process the file. Alternatively use an underscore _ instead.**

Step 3: Add trip info


```
Example passage1 - Notepad
File  Edit  Format  View  Help
*Begin Example_passage1

*date 2018.07.12
*team Insts Jon Arne Toft
*team Notes Dickon Morris
*team Pics Dickon Morris
*instrument Becka's DistoX
*ref 2018#03
```

- Add information about the surveying trip.

- This information won't be used by Survex to help create the 3D file, hence the line begins with a semicolon; instead of a star*.

- *The date is important for the 3D file as it allows users to see which passages have recently been surveyed with the software's "colour by date option" if you ; comment it out it'll just appear white.*

- This data is important as it allows other parties to review the details of your trip and help them understand what has happened if issues arise in the future.

- For example if we wanted to clarify where specific survey stations are in a survey we know who to go to to ask.

Step 4: Declination


```
*date 2018.07.12
*team Insts Jon Arne Toft
*team Notes Dickon Morris
*team Pics Dickon Morris
*instrument Becka's DistoX
*ref 2018#03
*declination auto 36670.37   83317.43 1903.97
```

- You don't need to do this. Survex now uses the date and location to do this automatically and we set it once for the whole Loser area in kataster/1623.svx

- The earths magnetic field varies slightly depending on: date and location, therefore to avoid error in our survey it is important that survex takes this into account.

- Declination is the angle between magnetic north and true north, records can be found on various websites.

- To find out what the declination was for your trip go to http://www.ngdc.noaa.gov/geomag-web/#declination.

- See https://survex.com/docs/manual/datafile.htm

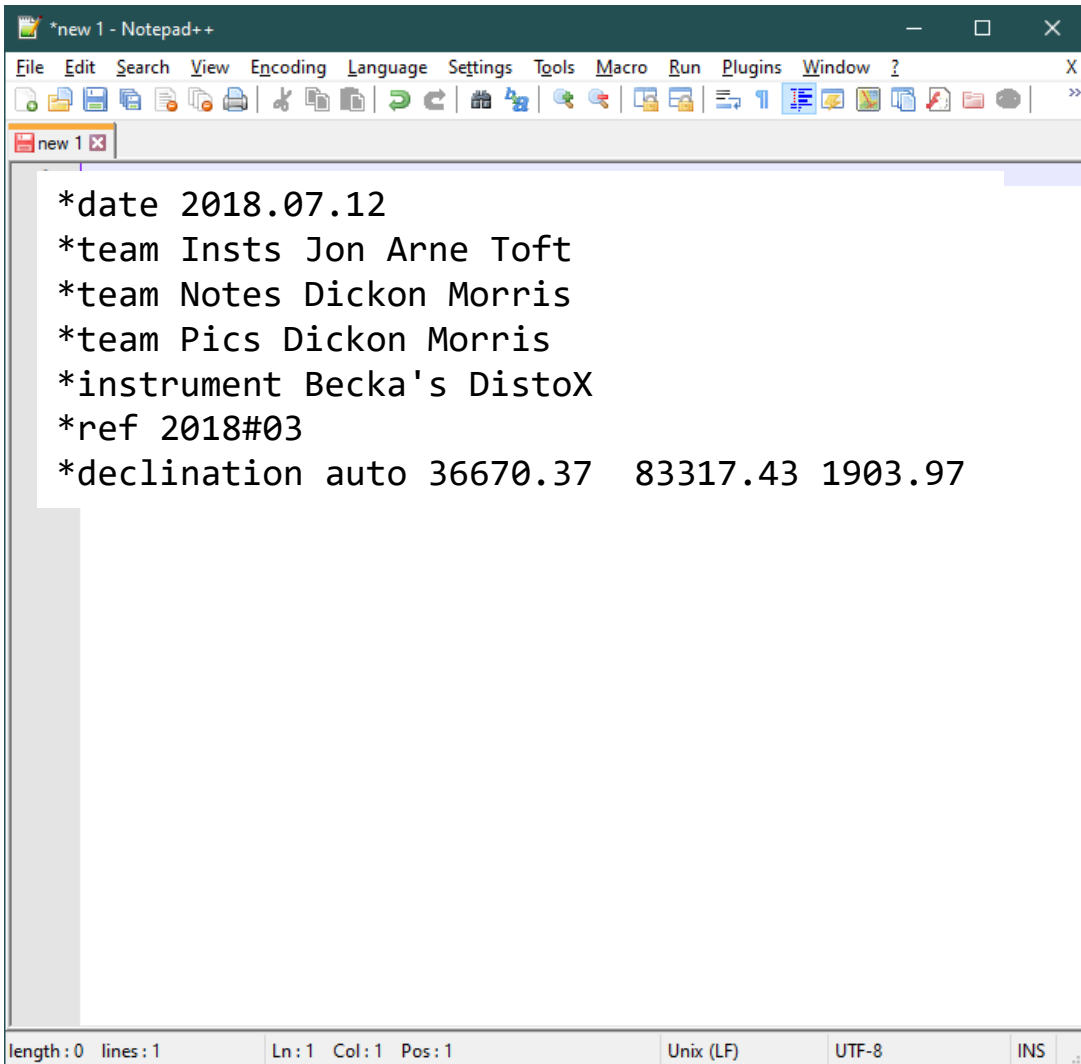# Step 5: Centerline Data

```
Example passage1 - Notepad
File   Edit   Format   View   Help

*begin example_passage1
*date 2018.07.12
*team Insts Jon Arne Toft
*team Notes Dickon Morris
*team Pics Dickon Morris
*instrument Becka's DistoX
*ref 2018#03
*declination auto
*data normal from to length bearing gradient ignoreall
1      2        3.66           227           -02
2      3        5.43           350           +24
3      4        12.28          278           +65
4      5        6.73           237           +48
5      6        5.62           214           +02
```

- Survex is pretty clever, you could input the stations in any order and as long as they all connect up, survex will still draw a 3D file for you.

- The convention is to put the data into survey as shown in the example.

- Tip: Use the Tab button instead of the space bar when inputting data, it'll neatly arrange the data into columns making it easier to understand.

- Note: see Survex manual for more ways of inputting centreline data.

Step 6: LRUD's

```
Example passage1 - Notepad
File  Edit  Format  View  Help

*begin example_passage1
*date 2018.07.12
*team Insts Jon Arne Toft
*team Notes Dickon Morris
*team Pics Dickon Morris
*instrument Becka's DistoX
*ref 2018#03
*declination auto
*data normal from to length bearing gradient
ignoreall
1    2    3.66       227        -02
2    3    5.43       350        +24
3    4    12.28      278        +65
4    5    6.73       237        +48
5     6   5.62       214        +02

*data passage station left right up down
ignoreall
1   1    0     3     1    RHW PH (4th)
2   0    1.8   12    1    LHW
3   4    0     14    1    RHW

*end example_passage1
```
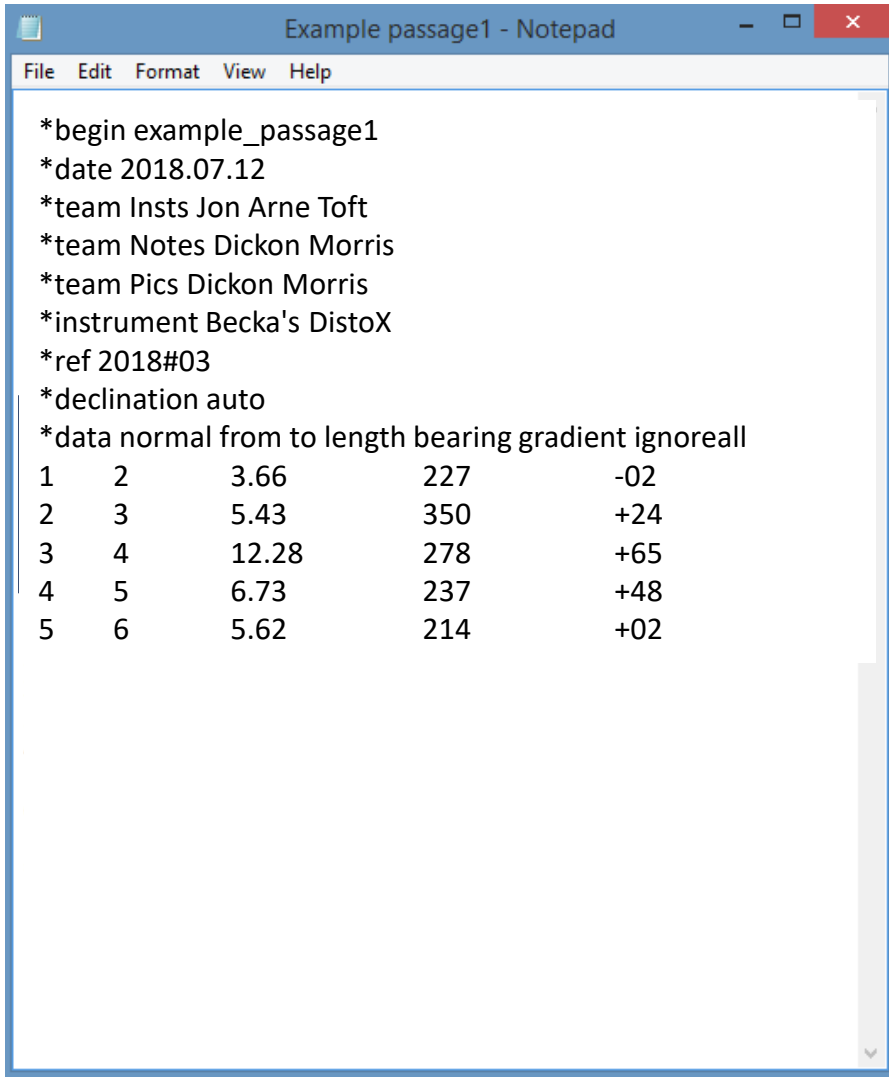
- In order to make the final 3D file appear 3D, you need to include passage dimensions.

- The convention is to take readings of the distances to the: Left, Right, Up and Down of the station it relates to and to note them down in this order.

- Note: for a normal passage LRUD's are simple, however when a passage includes junctions/small side passages they become more complicated.

- The next few slides explain how survex sees LRUD's and how to take them properly

LRUD's (Left and Right)

- First of all, survex doesn't necessarily insert LRUD's the way you might imagine.

Plan View
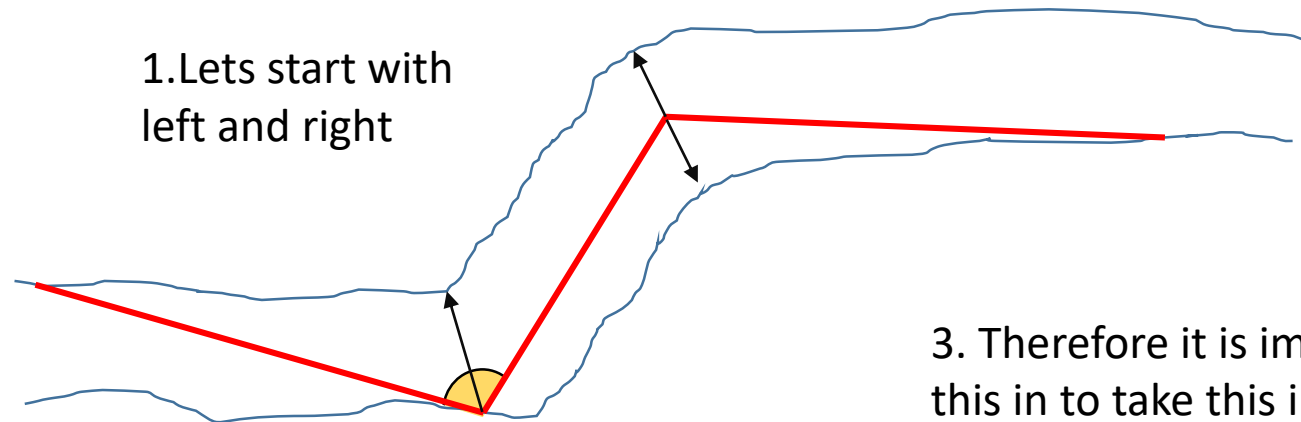
1.Lets start with left and right

2. When survex plots a left from a point, it'll do it in the direction that bisects the angle centrelines attached to it.

3. Therefore it is important to take this in to take this into account when taking LRUD's in a cave, especially if the angles in the centreline get really big/small

LRUD's (Up and Down)

The up's and down's in a survex file are plotted −90° +90° (clinometer reading) to each station. So imagine the cave passage is encased inside a bounding box, the Up's and Downs point at the ceiling and at the floor

Elevation

This works perfectly
for simple passages
like this
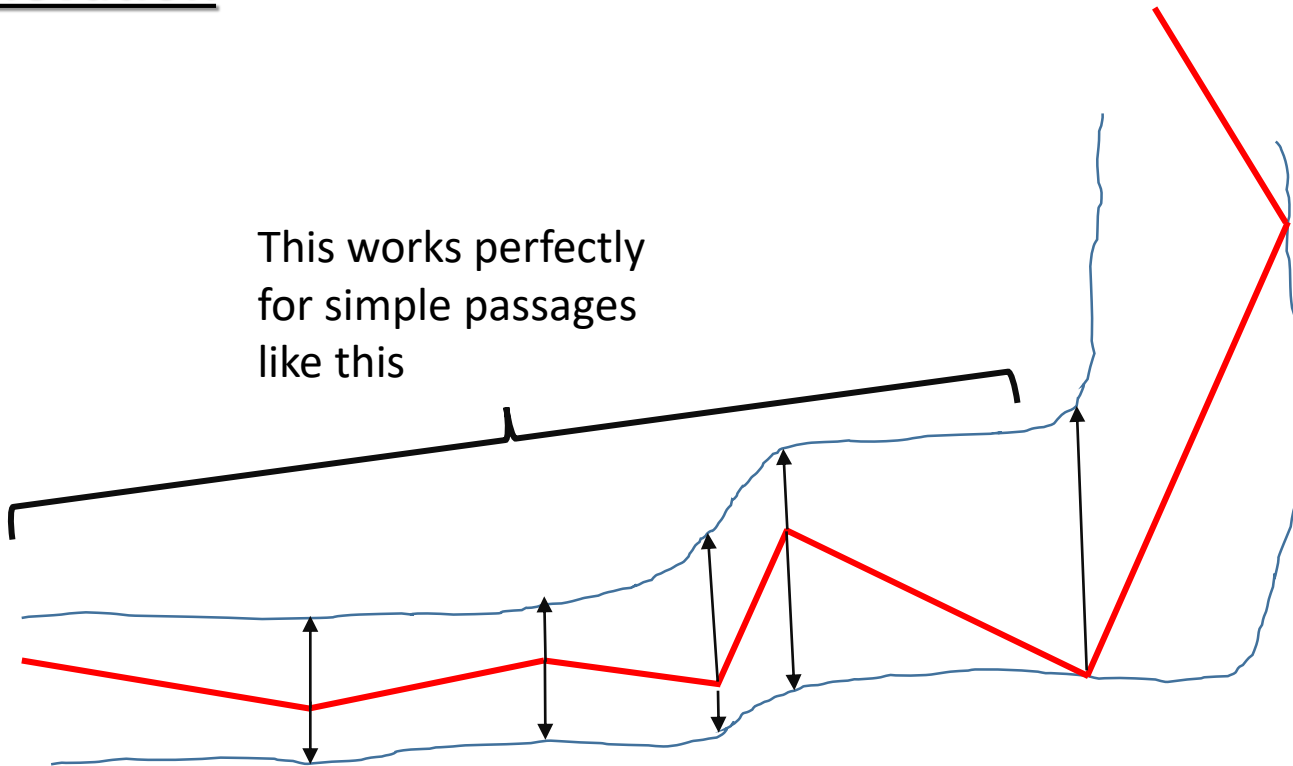
However doesn't work
very well for pitches as
the up readings are
difficult to read/look flat
in the final 3D file

Step 6: Station Descriptions

```
Example passage1 - Notepad
File  Edit  Format  View  Help

*begin example_passage1
*date 2018.07.12
*team Insts Jon Arne Toft
*team Notes Dickon Morris
*team Pics Dickon Morris
*instrument Becka's DistoX
*ref 2018#03
*declination auto
*data normal from to length bearing gradient ignoreall
1     2        3.66          227          -02
2     3        5.43          350          +24
3     4        12.28         278          +65
4     5        6.73          237          +48
5     6        5.62          214          +02

*data passage station left right up down ignoreall
1   1   0   3   1   RHW PH (4th)
2   0   1.8   12   1   LHW         ; top of stal middle of passage
3   4   0   14   1   RHW

*end example_passage1
```

- In order for other people to be able to easily pick up where you left off on a surveying trip it is important to keep a detailed record of where your survey stations are.

- This is particularly important at the end of a surveying trip or at a junction.

- To do this simply add a comment after the passage dimensions for a passage. Example comment shown on the second LRUD line.

Step 7: *End

```
Example passage1 - Notepad

File   Edit   Format   View   Help

*begin example_passage1
*date 2018.07.12
*team Insts Jon Arne Toft
*team Notes Dickon Morris
*team Pics Dickon Morris
*instrument Becka's DistoX
*ref 2018#03
*declination auto
*data normal from to length bearing gradient ignoreall
1      2         3.66            227            -02
2      3         5.43            350            +24
3      4         12.28           278            +65
4      5         6.73            237            +48
5      6         5.62            214            +02


*data passage station left right up down ignoreall
1   1   0   3   1   RHW PH (4th)
2   0   1.8   12   1   LHW
3    4   0   14   1   RHW

*end example_passage1
```
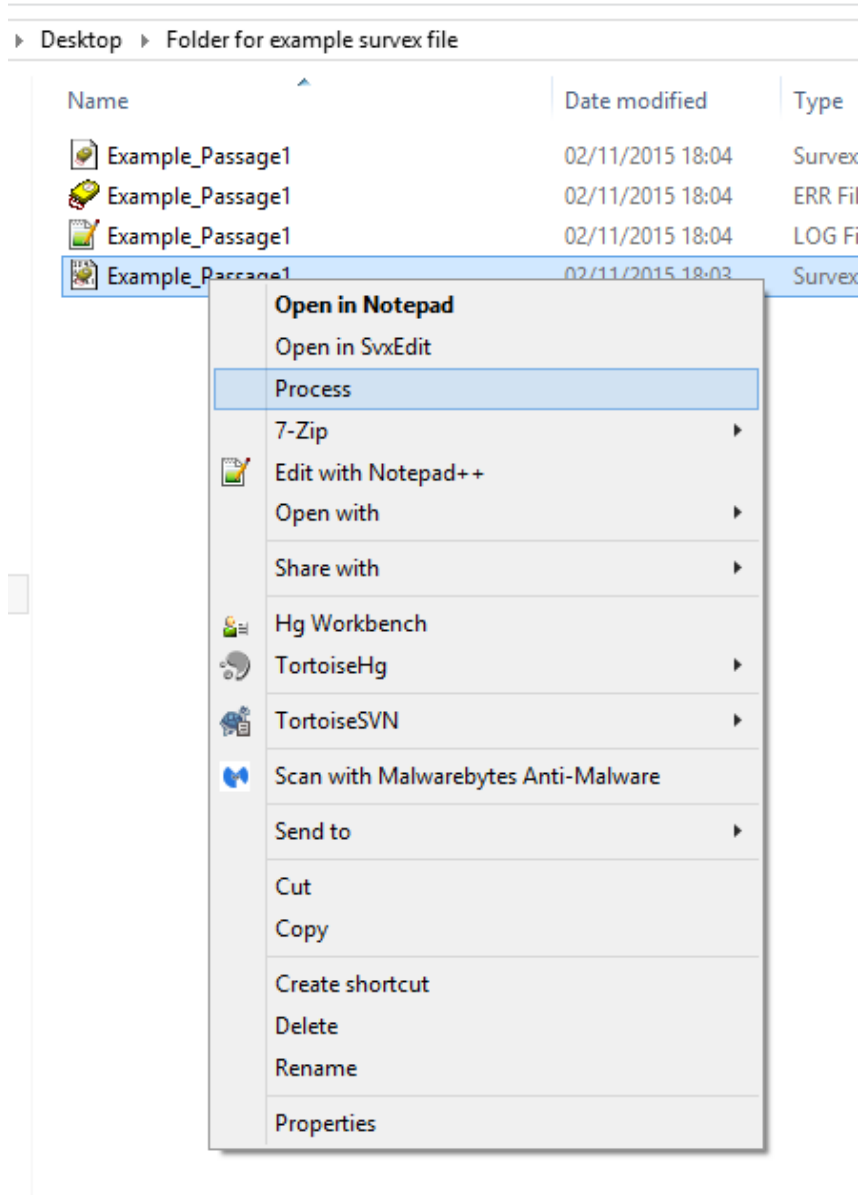
- Similarly to *begin, you need to let survex know when you've finished inputting the data.

- Enter "*End (the name of the survex file, same as the one at the start after *Begin)

Step 9: Create 3D file
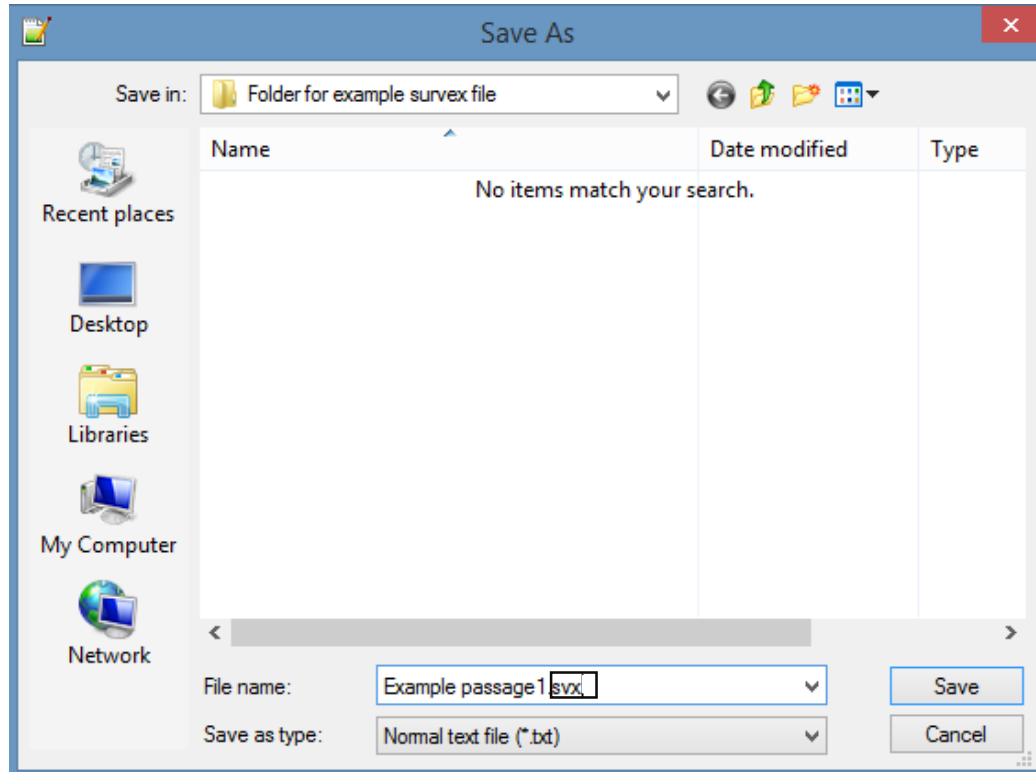
- To create a survex file do the following

- Save as .svx (in this case Example passage1.svx)

- Process the file by right clicking on the file and clicking process

Step 10: Process the 3D file

- Finally right click on the file once it as been saved as .svx

- Click on process

- The file should automatically be processed into a 3D file and a log file

- If something has gone wrong with the file, you will get an error file (ERR file). This is useful as it gives you an indication of what has gone wrong with your survex file

- E.g. Passage1.svx:1:16: error: End of line not blank passage1.svx:28:14: error: End of line not blank

  This means that the 16th character of the 1st line & the 14th character of the 28th line has something wrong with it, in this case I left a space in the name of the passage.

Examples

There's more than one way to make a survex file, I've attached some examples of some very different survex files which all essentially do the same thing.

For more details about survex and how to do more fancy stuff either look at the survex manual (see Attached) or wait for the next instalment of Brendan's surveying Tutorials.

These files will be a bit more complicated as they're involved in a larger system of files (see next slide) and it seems people have different styles when it comes to making a survex file.

If you're just starting out, it's probably best to just find a template and stick to that.

This is a really simple introduction, I've probably missed out quite a lot but it's probably enough to help you if your using survex or something.

Next time… Cave Jigsaw

- Each survey trip will have it's own individual **survex file** associated with it.

- These files are typed up in text format and can be processed, to give a 3D version of the file viewable in Survex's 3D cave viewing software - Aven.

- Survex files can be 'stitched' together to produce a larger 3D model comprising of several survex files tied together.

- Survex files are tied together using a hierarchical system which I will go into in the next tutorial.

This Lesson focuses On this level only.

Survex files For individual Surveying trips.

Individual survex files are tied together - another text file is created instructing Survex on which files/stations to tie together

Survex files Organized into different files according to which cave they came from

Individual caves tied together - another text file is made instructing survex on which caves/stations to tie together

3D model Of entire Cave system/ Area